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## Pine Butterfly

By Walter E. Cole<sup>1</sup>

The pine butterfly (*Neophasia menapia* F. & F.) occurs quite generally throughout ponderosa pine stands in the northwestern United States and western British Columbia (fig. 1). Populations of this insect may remain relatively low for quite a few years and then appear in great numbers. During these outbreaks the pine butterfly is a serious tree killer. Ponderosa pine is the preferred host tree but during outbreaks, and particularly in stands of mixed species, this insect feeds on Douglas-fir, western white pine, larch, and western hemlock.

A severe outbreak of pine butterfly occurred on the Yakima Indian Reservation in Washington between 1893 and 1896. Mortality of ponderosa pine over an area of 150,000 acres ranged from 20 to 90 percent and was estimated at nearly 1 billion board feet. An outbreak was recorded on Vancouver Island, British Columbia, in 1896, in ponderosa pine and Douglas-fir.

A severe infestation near New Meadows, Idaho, in 1922 and 1923 involved 27,000 acres of ponderosa pine and killed approximately 26 percent of the stand. According to reports, about 14 percent of the mortality resulted from bark beetle attack following defoliation.

In 1950, an infestation appeared within the Boise National Forest in southern Idaho. This infestation was aerially sprayed in 1954 and losses were less than 1 percent of the stand.

### Evidence of Infestation

The adult pine butterfly is readily observed within timber stands, and any increase in numbers is quickly noted. Normally, a few adult butterflies can be observed in August. If, during aerial surveys of large forested areas, six or more butterflies are detected flitting about the top of each tree, epidemic populations can be expected the following year. However, ground observations of about 24 butterflies per tree are needed to equal this aerial standard.

Under ordinary conditions, butterfly larvae feed only on the older needles, but under epidemic conditions they eat both new and old needles.

### Description

The adult butterfly is white with black wing markings and has a wing spread of about  $1\frac{3}{4}$  inches. In general, it resembles the common cabbage butterfly. Females have a distinct yellowish cast, but males are pure white (fig. 2).

The emerald-green eggs are about 1 millimeter wide by  $1\frac{1}{4}$  millimeters long and are laid in single rows on a needle (fig. 3).

Immature larvae are pale green and have black heads (fig. 4, A). Two white lateral stripes are present on the full-grown larva, and the head shades to its final color of green (fig. 4, B). Mature larvae are approximately 1 inch long.

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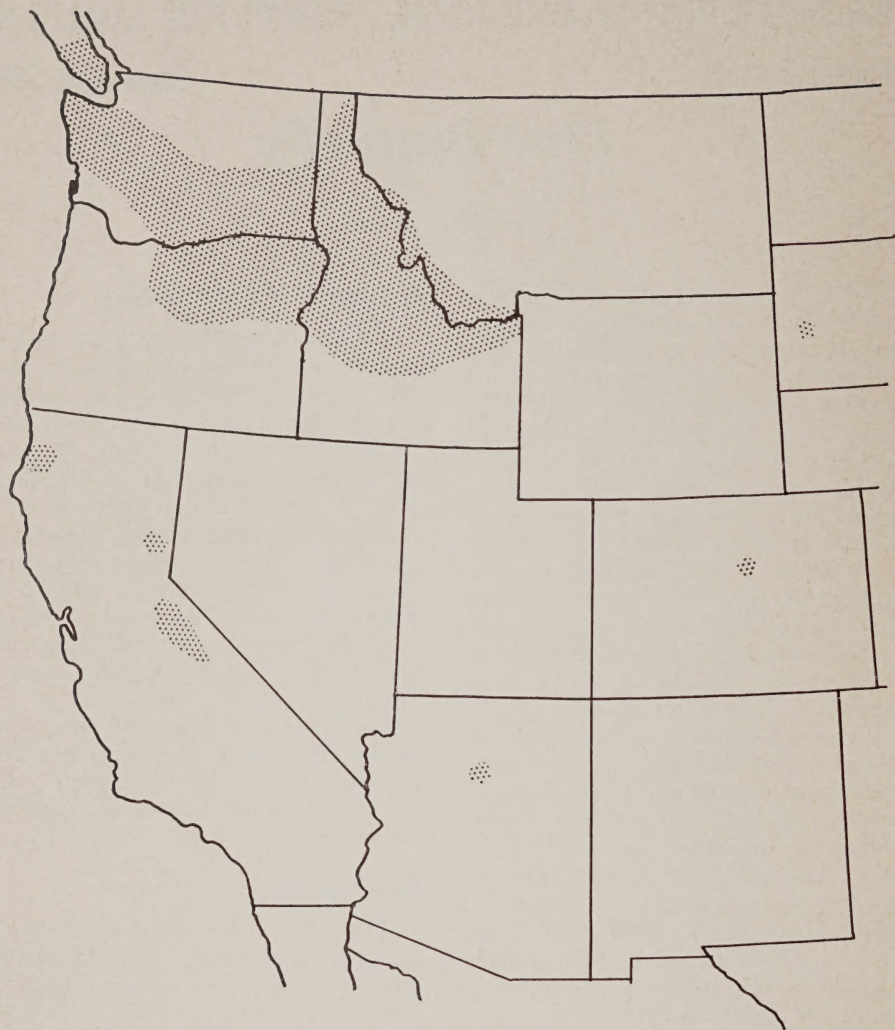


FIGURE 1.—Distribution of the pine butterfly in Western United States and British Columbia.

The female pupa is dark brown and the male yellowish green. Pupae of both sexes have yellowish-white lines similar to those on the mature larva.

### Life History

The peak flight of the butterfly occurs about mid-August. Males usually emerge about a week before females. Mating often occurs immediately after females emerge. Within a few hours after mating the

female begins depositing eggs, but these do not hatch until the following spring.

Larvae emerge from the eggs when new shoots of ponderosa pine are about 2 inches long. Both egg hatching and needle growth are directly affected by spring weather: warm temperatures cause early hatching. Feeding on needles occurs during the 6- to 8-week larval stage. Immature larvae feed gregariously on single needles at first,





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FIGURE 2.—Adult pine butterflies: male, upper; female, lower. (Actual size.)

but later in their development they feed individually. During epidemics they may consume the entire needle; larvae of smaller populations destroy approximately one-half of the needle.

Mature larvae migrate to bark crevices, limbs, or twigs, or else lower themselves on silken threads to the ground vegetation where they transform to pupae. The pupal stage lasts for 10 to 15 days. There is but one generation each year.

### Natural Control

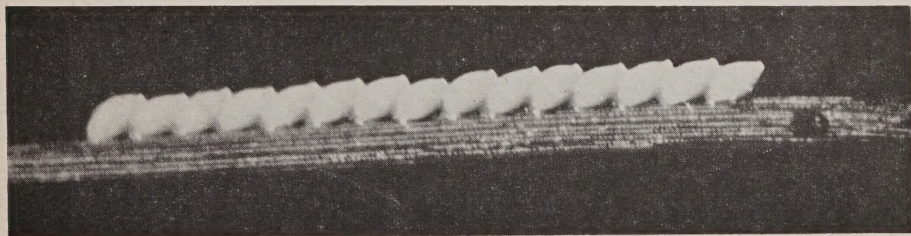
Associated with the pine butterfly is a wasplike parasite (*Theronia*

*atalantae* Poda) that has been credited with reduction of past outbreaks. Buildup of the parasite population usually lags 1 to 2 years behind the butterfly buildup. A fly (*Agria affinis* Fall.) was commonly found as a pupal parasite in 1953. A predaceous sucking bug (*Podisus placidus* Uhler) was present in large numbers during the 1922-23 epidemic. A predaceous snake fly was found to some extent in 1953. How effective these natural enemies are in controlling or preventing outbreaks of the butterfly is unknown.

### Direct Control

Infestations within forested areas can be controlled by aerial spraying. The insecticide solution commonly used is formulated at the rate of 1 pound of technical grade DDT to 1.25 quarts of auxiliary solvent plus sufficient No. 2 fuel oil to make 1 gallon. It is applied at the rate of 1 gallon per acre. Spray can be applied as soon as egg hatching is completed.

The pine butterfly can be controlled on individual trees by spraying with ground equipment, using one of several commercial insecticides for control of defoliators. A 25-percent wettable DDT powder is commonly used and should give satisfactory control. Oil solutions should be avoided in ground application because of the danger of their causing foliage burning. The pine butterfly is rarely a problem on individual ponderosa pines around sum-



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FIGURE 3.—Eggs of pine butterfly ( $\times 5$ ).





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FIGURE 4.—A, Gregarious feeding of first-instar larvae of pine butterfly ( $\times 1.7$ ); B, full-grown larvae and pupae of pine butterfly on needles of ponderosa pine ( $\times 1.7$ ).

mer homes or in communities unless they are relatively close to forested areas.

**Caution:** DDT is poisonous and should be used with due precautions and according to recommendations. It should be stored in a safe place, properly labeled, and away from food.

Since DDT may adversely affect aquatic life, avoid spraying it over streams and lakes. Specialists in aerial application of insecticides should be consulted in planning large-scale projects.

## References

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